

**Engineers Australia  
Engineering Heritage Victoria**

Nomination for Recognition  
Engineering Heritage Australia Recognition Program

# **Big Lizzie**



**September 2017**

**REVISION/CHECKING HISTORY:**

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## 1 INTRODUCTION

“What is that?”, is the most common phrase when people first view Big Lizzie as they travel through Red Cliffs township on the way to Mildura on the Calder Hwy in North Western Victoria.

The huge tractor is a mixture of metal and wood and is now a historical monument to celebrate the pioneers who created the Irrigation oasis of the Sunraysia Area.

The century old Big Lizzie is historically significant as it was the primary machine responsible for clearing vast areas of the Mallee scrub across North Western Victoria. This clearing enabled the expansion of irrigation, with Sunraysia Area now one of Australia’s premium horticultural food bowls.

October 2017, will mark 100 years since it rumbled into the Mildura Area, on its way to Broken Hill. A journey which would never eventuate.

Big Lizzie is effectively one of the largest tractors to be ever manufactured in Australia, it is historically significant in many ways, from its enormous size to its unique “dreadnaught wheels”, to its uniquely Australian story. A story that is founded on ingenuity, innovation and gritty determination, making this machine not only an engineering oddity but a historic treasure.



**Figure 1.** Big Lizzie Tractor and Trailer on display at Barclay Square, Red Cliffs



## 2 LOCATION

Big Lizzie is located at Barclay Square, the town square of Red Cliffs, located at the corner of Calder Highway (Jacaranda St) and Jamieson Ave.

Red Cliffs is located 14 kilometres from the rural city of Mildura in North West Victoria.

Big Lizzie was gifted to the Red Cliffs Community by the Mildura Rural Council in August 1971.

It was restored over the following year and as an integral part of Red Cliffs Jubilee Celebrations it became a permanent monument from October 1972.

In March 2001 it was listed on the Victorian Heritage Register.

It is now managed by the “Friends of Big Lizzie”, a volunteer sub-group of the Red Cliffs Historical Society.



**Figure 2.** Big Lizzie location at Red Cliffs

### 3 NOMINATION

#### 3.1 Extent of Nomination

This Engineering Heritage Victoria nomination includes:

- Big Lizzie prime mover and associated trailer
- Patented “dreadnaught wheels”
- Inventor, creator and operator Mr. Frank Bottrill.

#### 3.2 Why is it significant?

Big Lizzie is a road train comprising the tractor and one of two original trailers, which were designed and constructed with “dreadnaught wheels” by Mr. Frank Bottrill. The unique wheels were developed and proven on a variety of traction engines and road trains in the years before Frank Bottrill commenced work on Big Lizzie.

Frank Bottrill planned to use Big Lizzie to transport goods between the Broken Hill and outback N.S.W. Big Lizzie was constructed in 1916 and its journey to Broken Hill had to be cut short by a flooded Murray River at Mildura in October 1917. Big Lizzie was then re-purposed and used for transporting record wheat harvests to various hauling tasks. It was land clearing that Big Lizzie was proven to be the most successful.

Big Lizzie’s historical significance is in association with the land clearing of the Mildura area for agricultural purposes. This phase of clearing coincided with the setting up of soldier irrigation settlements following World War One. There were a number of grazing leases in the Mildura area which could be readily resumed by the Victorian Government, and irrigation blocks were a favoured means of settling a large number of families on limited supplies of land. The clearing of land at Red Cliffs in which Big Lizzie was instrumental is a major example of this development.

Big Lizzie is of technological significance as the only conserved example of the innovative “dreadnaught wheel” developed by Mr. Frank Bottrill and applied to tractors for land clearing and hauling under difficult conditions. The dreadnaught wheel proved reliable and effective for its purpose and was widely, if briefly used in Victoria, Queensland and South Australia. The Dreadnaught wheel demonstrates the part played by the individual inventor, experienced in outback conditions, in the development of technology for Australian bush. Big Lizzie was a one-off design and made use of a hybrid collection of available technologies, designs and materials.



**Figure 3. Big Lizzie’s Trailer**

## 4 HISTORY

### 4.1 Frank Bottrill – Early Years

Mr. Frank Bottrill was born on 1<sup>st</sup> April 1871 at Sturt, South Australia. He was the 3<sup>rd</sup> son of John Lucas Bottrill and Eliza Macklin.

Frank was interested from an early age in things of a mechanical nature, resulting in him undertaking an apprenticeship as a blacksmith. Before the advent of the motor vehicle, the trade of the blacksmith made repairs to horse drawn vehicles, pumps, engines and mining / agricultural equipment. During his apprenticeship he studied engineering and drafting. His family moved to Moonta in South Australia, with Frank working as a blacksmith at the copper mines.

The riches of the Broken Hill mines, eventually attracted Frank Bottrill to the outback, where he was gainfully employed working on maintaining steam engines for the mines.

### 4.2 Necessity is the Mother of Invention

It was at Broken Hill that Frank Bottrill saw the trains Afghan camels struggling to traverse the outback under the heavy burden of wool bales. It was his concern for the humane treatment of the overloaded camels, resulting in Frank being interested in finding a better way to transport goods along the sandy tracks that serviced outback stations.

Frank was of the belief that the steam traction engine towing a wagon would be able to undertake this transport journey more efficiently and easily than that of the camels.

In his early 20's, Frank Bottrill purchased a steam engine tractor and wagon in Adelaide and set off for Broken Hill. However somewhere north of Morgan on the journey to Broken Hill, the tractor and wagon became bogged in a sand dune and after many days of trying to free it, Bottrill abandoned it and faced a long trip home.

It is likely that during the days trying to get the tractor un-bogged, that Frank conceived the idea of fitting the wheels of a tractor engine with some type of bearer to distribute the weight and traction effort. With greater surface area in contact with the ground, transportation over loose sand could be achieved.

Frank Bottrill could have given up and returned to concentrate on being a blacksmith in the Broken Hill mines, however he was determined to persevere with his ideas.

### 4.3 Invention of the Dreadnaught Wheel

Soon after his abortive trip from Adelaide to Broken Hill, Frank Bottrill developed a prototype traction engine wheel using twelve bearers. After much experimentation and research he was eventually satisfied with his invention and patented the design in 1906.

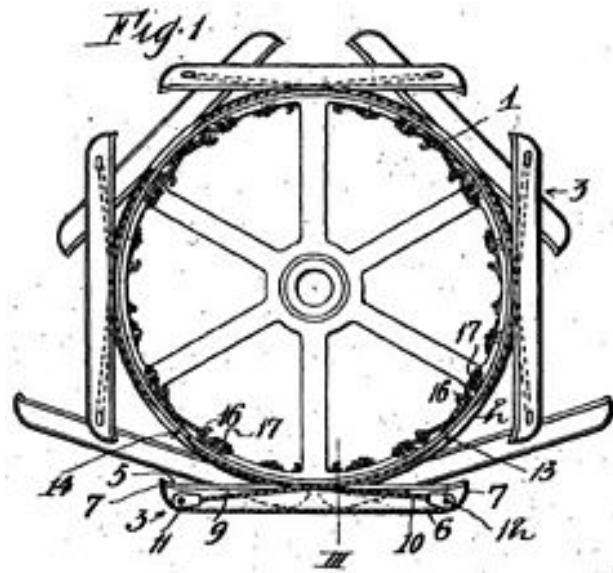
The design called the "dreadnaught wheel" was described as "an improved road wheel for vehicles and travelling machines, especially useful for traction engines".

The "dreadnaught wheel" consisted of a steel wheel with a number of bearers, with each bearer attached in two rows to the rim by a series of cables. The cables allow the free movement of the bearers while holding it close to the rim.



When the end of the bearer touches the ground it is drawn under the wheel by the forward motion of the vehicle. The cables enable the wheel to roll smoothly along the length of the bearer. The bearer is then picked up by the cables and then again carried around the rim of the wheel.

Spacing of the bearers into two rows around the rim of the wheel ensures that at all times one of the bearers is in full contact with the ground at all times.



**Figure 4.** Illustration from Bottrill's 1912 patent filing in the United Kingdom



**Figure 5.** One of Big Lizzie's restored "dreadnaught wheels"



**Figure 6.** The two rows of staggered bearers can be seen



**Figure 7.** The bearers are attached to the rim via cables to enable them to rotate around the rim as it rolls

#### 4.4 Other types of Traction Engine Wheels

The “dreadnaught wheel” was similar to other tractor wheel systems developed at the time.

##### **Endless Railway**

The “endless railway” wheel was patented by James Boydell in England. The “endless railway” wheel had a single row of interlocking bearers which were loosely attached to the wheel rim by V shaped yokes. The yokes allowed the bearers to rock around the rim of the wheel. Despite the fact that the yokes suffered rapid wear and tear, a large number of engine machines were fitted with these types of wheels.

##### **Pedrail**

The “pedrail” wheel used a row of round pads fitted to the wheel rim, by a ball and socket arrangement. This system gained limited acceptance and use, likely due to its wear and tear on the ball and socket.

#### 4.5 The Competition

The British War Office was offering a prize of 1000 pounds for a traction engine system that would be suitable over various terrains and ground conditions.

Although an engine fitted with the “dreadnaught wheel” design was entered, it was a design by Benjamin Holt from the USA, with his “caterpillar” design that was considered to have successfully performed the best.

With the outbreak of World War One in 1914, the “caterpillar” design was deployed on a number of war machines. The “caterpillar” tank being the most successful and considered to have contributed significantly to the outcome of the war.

#### 4.6 Use of the Dreadnaught Wheel

Following the patent of the “dreadnaught wheel” in 1906, the South Australia Government engaged Frank Bottrill in 1907, to undertake a land clearing at Tintinara in the South Australia’s Murray Mallee. This machine was fitted with twelve bearers per wheel. The success of this works resulted in further large clearing projects in the Murray Mallee.

The word of the land clearing success of the “dreadnaught wheel” machine spread to Queensland and Victoria. With “dreadnaught wheels” being fitted to engines in mines at Cloncurry and log-hauling tractors at Gippsland.

In 1914, during the construction of the transcontinental railway, a tractor was installed with a set of large rear “dreadnaught wheels” for the construction of a section of railway west of Port Augusta.

Prior to the construction of Big Lizzie, the patented “dreadnaught wheel” was used at the Mt Gunson copper mine north of Port Augusta. This prime mover tractor and its wagon transported a full load of 35 tons, 25 tons on the wagon and a further 10 tons on the back of the prime mover.

In 1916, the Australian Light Horse used “dreadnaught wheels” fitted to field guns so they could be hauled across the Egyptian desert.

## 4.7 Construction of the Biggest Tractor

Based on the success of the “dreadnaught wheels” on various tractors, Frank Bottrill was determined to complete his original aim of having a machine that could transport goods across the difficult terrain of the outback.

In 1915, he made a start on his tractor of all tractors, one that would be grand of scale and size.

Frank Bottrill selected the McDonald Company in Richmond, Melbourne to assist with these grand plans. The “dreadnaught wheel” had been successfully fitted to a number of McDonald Tractors over the previous years.

With the financial backing of Mr. Ralph Falkiner, a wealthy station owner from western Victoria, Frank Bottrill was able to dream big and build big. The expertise and facilities of the McDonald Company enabled a machine to be built that would be bigger and more powerful than any other in Australia and likely the World at that time.

To Frank Bottrill’s design, the McDonald Company commenced the construction of the massive tractor. Special machinery was required to be made to fabricate the enormous parts required.

The twelve months of construction was a huge undertaking, with part either rivets together or oxy-acetylene welded. The fabrication of the twelve wheels with their seventy two bearers, the eight ton engine and transmission system all on such a large scale would have required determination and dedication.



**Figure 8.** *The size and scale of Big Lizzie always attracted attention*

## 4.8 Big Lizzie Name

“Big Lizzie” came from the name of a huge gun that England developed during World War 1 to shell Berlin, a countermeasure to the German’s “Big Bertha”.

The massive tractor was also called “The Desert Train”, as an answer the questions of “What is it?” when anyone saw it.



## 4.9 The Long Road Ahead

The journey from Richmond to Broken Hill was going to be a significant journey for such a large machine, and was going to draw crowds where ever it went. Frank Bottrill had predicted that it would be an eight to nine months trek, one that would never be achieved.

In March 1916, Big Lizzie left the McDonald's factory in Richmond, and due to traffic, telegraph / electricity wires that need to be raised, it took two days to clear the outskirts of Melbourne.

Culverts and bridges along the way were bypassed, with creeks and rivers forded to prevent possible damage due to Big Lizzie's size. However at Kilmore, Big Lizzie attempted to use a timber bridge in which the prime mover broke through the bridge decking. This was a costly delay.

On the outskirts of Kilmore, the police stopped Frank Bottrill with concerns that he was a German spy. This was a result of rumors and stories being spread about this strange machine travelling through Victoria was in fact a secret German weapon. Frank Bottrill was able to eventually dismiss these rumors and continue the journey.

The journey was further hampered due to rains and flooding of creeks and rivers. In early December 1916, the crossing of a swollen Campaspe River resulted in more than a months delay, as Big Lizzie was not permitted to use the bridge. A suitable location to cross the river was selected, however one of the banks requiring substantial earthworks to form an inclined roadway to enable the crossing to occur. Big Lizzie's 45 tons prevented it from being washed away from the turbulent waters during the crossing.

Frank Bottrill had plans to cross the Murray River at Echuca, however due to the flooding rains the Murray River was impassable with Big Lizzie not permitted to use the Echuca Bridge over the Murray River.

Big Lizzie arrived in Echuca on the 11 December 1916, with much public attention. However, Frank Bottrill decided to continue to travel along the Murray River to Kerang, with a possible crossing of the Murray River at Swan Hill.

Big Lizzie arrived in Kerang on 15 January 1917 and was expected to journey on to Swan Hill once it negotiated the Loddon River. The rain sodden conditions had taken a toll on Big Lizzie, and it would be June before Big Lizzie was once again on the trek towards Broken Hill.



**Figure 9.** Big Lizzie travelling through Swan Hill in 1917

It was eventually considered that Mildura would be a more suitable crossing location. So Big Lizzie, passed through Swan Hill and arrived at Ouyen in August 2017. The trek to Mildura from Ouyen involved crossing three large sand dunes the first time that Big Lizzie was to experience the sandy outback conditions it was design for. These dunes were successfully negotiated.

Big Lizzie arrive in Mildura in October 2017, however hopes of continuing the journey to Broken Hill were made unthinkable as the Murray River was in flood and Big Lizzie was not allowed to use any ferries or bridges. This would be the closest that Big Lizzie would ever get to Broken Hill.

#### 4.10 Big Lizzie at Work

With Big Lizzie having not made any income for Frank Bottrill and the Murray River in flood, Frank was forced to put Big Lizzie to work.

At that time, the Mildura area was a busy period for irrigation development and the Millewa area busy with wheat production.

In January 1918, Big Lizzie commenced wheat carting, bring in massive loads with each journey. One load was estimated at being 80 tons and considered to be a record for a land vehicle at that time.

Big Lizzie found many opportunities in the Mildura region for work, from carting grape trellis posts to railway sleepers to even houses. In 1923, Big Lizzie was used to transfer steam engines from Red Cliffs to Lock Nine on the Murray River.

However, it was in land clearing that Big Lizzie was considered the ultimate machine, with Frank Bottrill wining many land clearing contracts.

In late 1918 / early 1919, Big Lizzie was busy at work undertaking land clearing for the Merbein Irrigation District. In late 1920, Frank Bottrill was awarded the contract from the State Rivers and Water Supply Commission to undertake large scale land clearing in the Red Cliffs area.



**Figure 10.** Big Lizzie transporting a house to a new location



**Figure 11.** *Big Lizzie transporting Steam Engines to Lock Nine*



**Figure 12.** *Big Lizzie's record haul of wheat*

Land clearing at that time in the Mildura area, was very labour intensive using mechanical tree pullers (winches and jacks) to pull up tree roots and stumps.

Big Lizzie's immense power enabled it to pull out numerous trees in one pull. Four heavy steel (25 mm (1 inch) diameter) cables were attached to Big Lizzie including the use of outrigger poles to maximize the reach for each pull. A crew of sixteen men were used (four on each cable) to place the cables around trees, stumps and bushes. The various vegetation was ripped from the ground as Big Lizzie pulled forward and the cables became taught. Big Lizzie worked successfully in both forward and reverse as its maneuverability was slow and problematic.



**Figure 13.** *Big Lizzie during Land Clearing (note outriggers and cables)*

Repairs to the cables was one of the main maintenance tasks, with the front of Big Lizzie's deck becoming a full blacksmith repair workshop.

Despite its size, Big Lizzie was not designed to knock over trees or stump, doing so would result in damage to the steering gear located underneath the chassis.

Clearing work at Red Cliffs was completed in 1924 and Frank Bottrill once again thought about continuing the journey to Broken Hill. However, since Big Lizzie's construction, roads had improved greatly in the outback with motorized trucks now starting to access outback areas.

The original financier of Big Lizzie, Mr. Ralph Falkiner had work for Big Lizzie on his Glendenning Station near Balmoral in South West Victoria. After eight years of working in the Mildura area, Big Lizzie was on a new journey.

#### **4.11 Big Lizzie heads South**

The journey to Glendenning Station, took eight months. This time the journey had to contend with avoiding damage to road pavements as well as bridges.

In September 1926, Big Lizzie arrived at the station and commenced clearing work and paying of the debt owed to financier Ralph Falkiner. However the Glendenning Station was suffering financial difficulties and soon one of Big Lizzie's trailers was sold off.



The financial difficulties deepened and eventually in 1928 Frank Bottrill left Big Lizzie to the Falkiners. However no-one had the patience or temperament to operate Big Lizzie.

Eventually Big Lizzie's engine was sold in 1938 to drive machinery in Pyramid Hill.

Big Lizzie was left on Glendenning Station rusting away in field.

#### **4.12 Big Lizzie's Final Journey**

A clearing sale was held at Glendenning Station in 1971 and the remains of Big Lizzie were offered as scrap metal. Fortunately the Balmoral Historical Society intervened and purchase Big Lizzie before she could be scraped.

Red Cliffs was celebrating its 50 year Jubilee, and the majority of the Red Cliffs Community thought that it would be appropriate if Big Lizzie was brought back as part of the celebrations.

A committee was established to transport Big Lizzie and its remaining trailer from its resting place at Glendenning Station to place at a park in Red Cliffs. A huge low loader was engaged as even without its engine, Big Lizzie still weighed 30 tons.

On August 26<sup>th</sup> 1971, Big Lizzie was delivered to Red Cliffs.

Big Lizzie was restored over the following year and was in October 1972 became a proud part of Red Cliff's Jubilee Ceremony and has been on-display ever since at Barclay Square.

The second trailer has been recently located at Heywood and has now been returned to Red Cliffs. It is currently undergoing restoration in preparation for the Red Cliffs 100<sup>th</sup> Celebrations in October 2022.

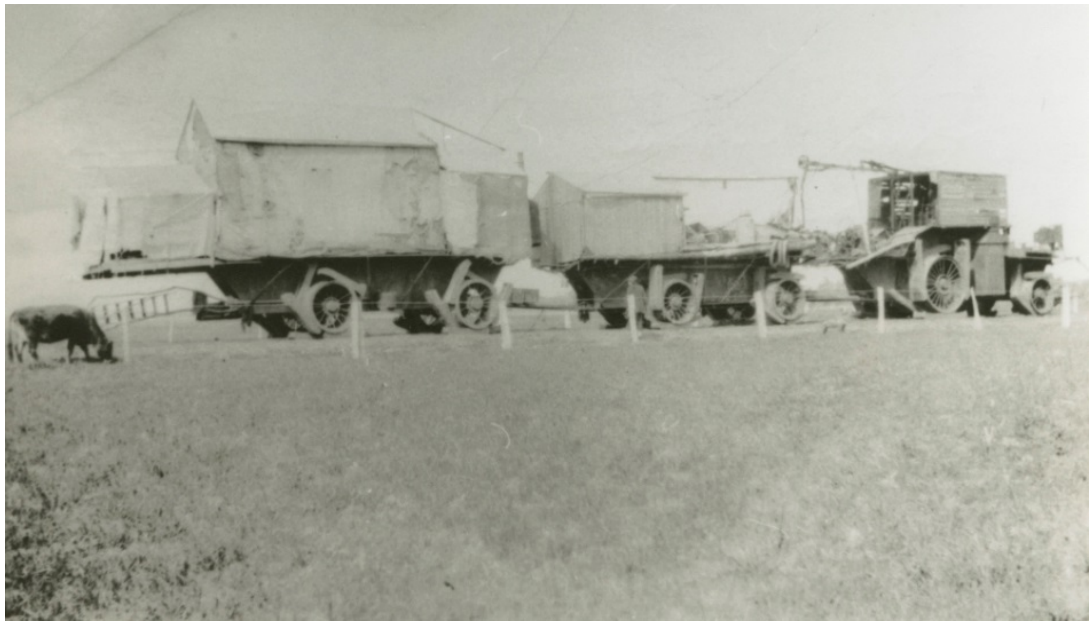
#### **4.13 Frank Bottrill – Later Years**

Frank Bottrill meet Margaret Young in Ballarat and married in March 1909. At that time they lived in South Melbourne and did not have any children.

The Bottrills lived on Big Lizzie. They were devout Seventh Day Adventist Christians and were strict vegetarians who abstained from tea, coffee, alcohol and cigarettes.

When work at Glendenning Station ran out in 1932, the Bottrills eventually crossed the Murray River to Dareton in New South Wales. Frank set up a blacksmiths business until his retirement.

Frank died on the 7<sup>th</sup> January 1953 at Mildura and is buried in the monumental cemetery at Nichols Point with his wife who died in Melbourne on 29<sup>th</sup> April, 1965.



**Figure 14.** *The Bottrill's mobile home*

## 5 SPECIFICATION

Big Lizzie had a Blackstone single-cylinder engine that delivered 60 horsepower at 275 rpm, running on a mix of diesel and crude oil. It was cooled by water, and had an exhaust-induced airflow "radiator" that Bottrill had designed. Big Lizzie could carry 80-85 tons when two trailers were attached.

There were just six bearers on each wheel, compared to Bottrill's earlier designs which had as many as twelve bearers. This placed more strain on the cables retaining the bearers, and had the effect of reducing the tractor's speed to one mile per hour.

### General Details:

- Prime Mover – 10.36 metres long, 3.35m wide, 5.49m high
- Weight – 45 tonnes
- Turning Circle – 61 metres
- Trailers(2) – 9m long, 3m wide, 2.13m high
- Payload – 10 tonnes on Big Lizzie's deck and 35 tonnes on each trailer (total 80 tonnes)
- 4 forward speeds 3.2, 2.4, 1.6, 0.8 km/h.
- 2 reverse speeds 0.8 and 0.4 km/h.

### Mechanical Details:-

- Power Unit 44.74 kw (60 hp) Blackstone water cooled single cylinder crude oil engine.
- Bore, 228 mm, Stroke, 450 mm, 215 RPM.
- Single flywheel, 2.13 m diameter, Weight 3 tonnes.
- Gear Box 3.15m long, 1.37m deep, 0.91m wide.
- Oil Capacity 430 Litres.
- 4 forward speeds 3.2, 2.4, 1.6, 0.8 km/h.
- 2 reverse speeds 0.8, and 0.4 km/h.
- Crude Oil 19,800 litres.
- General purpose water 3,400 litres.
- Drinking water 1,000 litres.

## 6 PHOTOGRAPHS



*Figure 15. The Restored Big Lizzie*



*Figure 16. The front deck of Big Lizzie was a Blacksmith workshop*





*Figure 17. The Cabin of Big Lizzie*



*Figure 18. Big Lizzie restored Trailer*

## 7 HERITAGE LISTING AND ASSESSMENT

Extract from Victorian Heritage Database

**VICTORIAN HERITAGE REGISTER NUMBER: H1919**

**HERITAGE OVERLAY NUMNER: HO104**

**NAME: BIG LIZZIE**

**LOCATION: NORTH EAST CORNER OF CALDER HIGHWAY  
AND JAMIESON AVENUE, RED CLIFFS**

**GOVERNMENT AREA: MILDURA RURAL CITY**

**CATEGORY: HERITAGE**

- **FARMING AND GRAZING**
- **TRANSPORT ROAD**

**DATE REGISTERED: 15 MARCH 2001**

**EXTENT:** All of Big Lizzie and its trailer marked BL and T1.

### Statement of Significance

#### What is significant?

Big Lizzie is a road train comprising the tractor (Big Lizzie) and one of two original trailers. The tractor and trailers were constructed with dreadnaught wheels designed to a 1906 patent by Frank Bottrill.

Bottrill had worked in Broken Hill as a blacksmith in the late 1890s and gained experience with steam engines there. Around the turn of the century attempted to transport wool from stations north of the Murray with a steam traction engine. The failure of this venture, when he had to abandon the engine in deep sand, stimulated him to invent the Dreadnaught wheel, which he patented in 1906. The wheels were developed and proven on a variety of traction engines and road trains in the years before Bottrill commenced work on Big Lizzie.

Bottrill planned to use this vehicle for transport of goods between the Murray and outback N.S.W. Construction began in a yard in Richmond in 1915 with close cooperation from the nearby McDonalds Foundry, which made the massive gearing and bearing components.

Big Lizzie terminated its inaugural journey to Broken Hill prematurely at the flooded Murray River in Mildura in October 1917. Big Lizzie was first used to carry a record-breaking load of 80 tons of wheat, and undertook other hauling tasks in the area.

Big Lizzie had a number of failings, including a maximum speed of one mile per hour, a huge turning circle and inadequate steering gear. Despite these problems, Big Lizzie was found to be very effective for the land clearing which was going on apace in the Mallee in the 1910s and 1920s.

In 1920 the Victorian Government, through the State Rivers and Water Supply Commission, contracted Bottrill to carry out a large scale clearing operation at Red Cliffs to create irrigation blocks for soldier settlement. Clearing in the area was previously largely carried out with small grubbing machines. Big Lizzie was equipped with a number of steel cables for pulling out trees and stumps, and a gang of up to sixteen men worked in a supporting role on the ground.

In 1926, when the work was completed, Bottrill took Big Lizzie to Glendinning to use on a clearing and share-farming operation there. This enterprise soon failed and Big Lizzie was left on the station until reclaimed by the Big Lizzie Restoration and Preservation Committee for the Red Cliffs community in 1971.

### **How is it significant?**

Big Lizzie is of historical and technological significance to the State of Victoria.

### **Why is it significant?**

Big Lizzie is of historical significance for its association with land clearing for agriculture in the Mallee and Mildura region. This phase of clearing in the Mallee coincided with the setting up of soldier settlement schemes following World War One, and with the continuing ideal of closer settlement. There were a number of grazing leases in the Mildura area which could be readily resumed by the government, and irrigation blocks were a favoured means of settling a large number of families on limited supplies of land. The clearing at Red Cliffs in which Big Lizzie was involved is a major example of this development. Big Lizzie is also of historical significance as an attempt to reduce transport costs that were still a burden to primary producers in the inland areas distant from railheads.

Big Lizzie is of technological significance as the only conserved example of the innovative Dreadnaught wheel developed by Frank Bottrill and applied to tractors for land clearing and hauling under difficult outback conditions. While the caterpillar track would ultimately prove the most successful design for the purpose, the dreadnaught wheel proved reliable and effective for its purpose and was widely, if briefly used in Victoria, Queensland and South Australia.

The Dreadnaught wheel demonstrates the part played by the individual inventor, experienced in outback conditions, in the development of technology for Australian bush. Though less lasting in its impact, the Dreadnaught wheel was an invention in the same lineage as the stump jump plough and the McKay's harvester.

Big Lizzie is of technological significance as a prime mover for its unusual design and for its sheer size, mass and hauling capacity. Big Lizzie was a one-off design which made use of a hybrid collection of available technologies, designs and materials.



## 8 INTERPRETATION PLAN

It is intended to conduct the heritage recognition ceremony for Big Lizzie as a part of the Engineers Country Weekend to be held in Mildura from 14 to 15 October 2017.

The actual ceremony will be held on Saturday afternoon on 14 October 2017 at the Barclay Square site at Red Cliffs where Big Lizzie is located.

Big Lizzie is currently part of the Mildura Rural City Council's Chaffey Trail and currently has two interpretation panels, located towards the Calder Highway of Barclay Square. The Chaffey Trail is located at many historic sites around the Mildura area.

Mildura Rural City Council is in the process of updating these current panels to match other recently updated Chaffey Trail signage.

As part of this upgrade, Mildura Rural City Council has agreed to update the current panels text with additional engineering information, and details on the "dreadnaught wheels" and the inclusion of the Engineering Heritage Marker, date of the marking ceremony and Engineers Australia Logo.

It is proposed that the new panels will be placed as the same location as the current panels.



**Figure 19.** Current signage at Big Lizzie



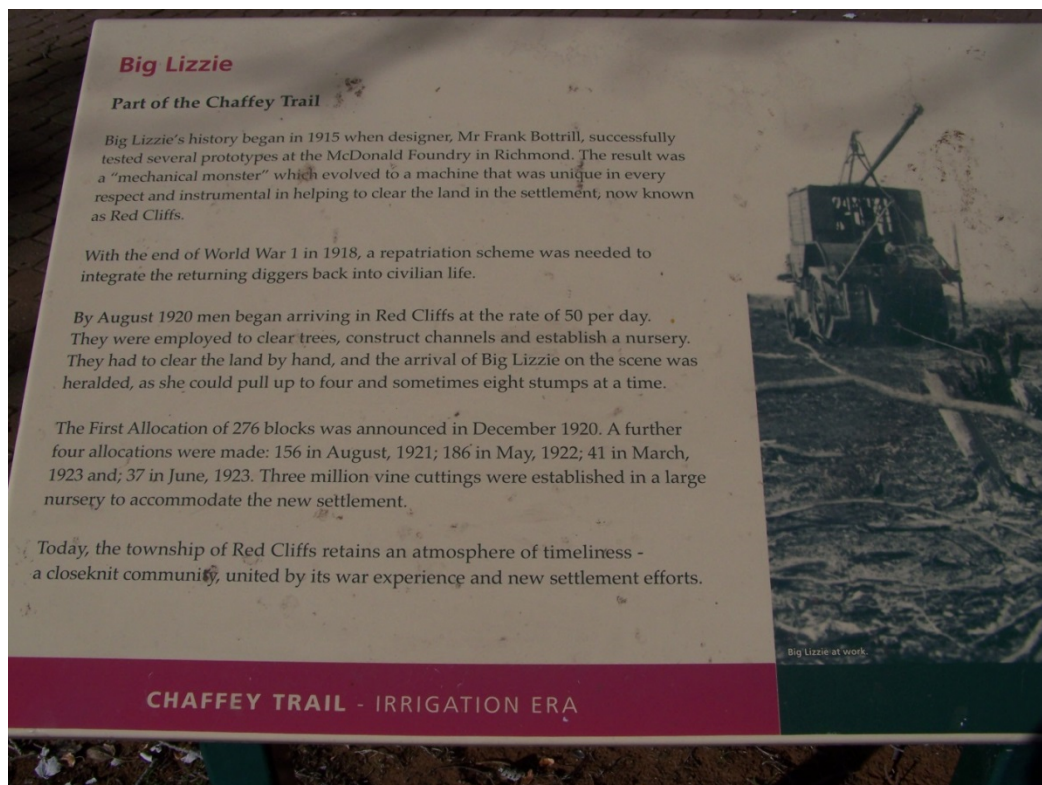


Figure 20. Chaffey Trail – Current Interpretive sign at Big Lizzie



Figure 21. Chaffey Trail – Other Interpretive sign at Big Lizzie

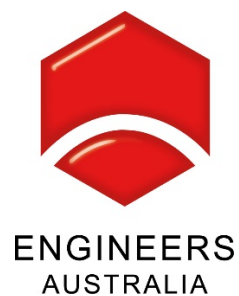
Engineering Heritage Marker to be at least 110 mm in diameter.



With the following words:

Engineering Heritage Marker placed on 14 October 2017

The Engineers Australia Logos is to be added to the signs:



**Figure 22.** Proposed updated interpretive sign No 1

## Big Lizzie

### Part of the Chaffey Trail

*Red Cliffs had been considered by the Chaffey brothers as a possible original site for their irrigation colony, but for several reasons this did not occur at that time.*

Big Lizzie's history began in 1915 when engineer and blacksmith, Mr. Frank Bottrill, successfully tested several prototypes at the McDonald Foundry in Richmond. These trials involved the "Dreadnaught Wheel" in which additional bearers were attached to the rim of a wheel and used to spread the weight of the vehicle. This enables vehicles to successfully travel over soft soils such as sand dunes.

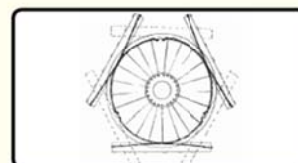
The result was a "mechanical monster" which evolved to a machine that was unique in every respect and instrumental in helping to clear the land in the settlement, now known as Red Cliffs.

With the end of World War 1 in 1918, a repatriation scheme was needed to integrate the returning diggers back into civilian life.

By August 1920 men began arriving in Red Cliffs at the rate of 50 per day. They were employed to clear trees, construct channels and establish a nursery. They had to clear the land by hand, and the arrival of Big Lizzie on the scene was heralded, as she could pull up to four and sometimes eight stumps at a time.

The First Allocation of 276 blocks was announced in December 1920. A further four allocations were made: 156 in August, 1921; 186 in May, 1922; 41 in March, 1923 and; 37 in June, 1923. Three million vine cutting were established in a large nursery to accommodate the new settlement.

The township of Red Cliffs retains an atmosphere of timeliness – a close-knit community, united by its war experience and irrigation settlement efforts.



### Did you know?

- Each wheel was 6 feet in diameter and 4 feet wide and fitted with 6 bearers each 7 feet long.
- Big Lizzie was named by Mrs. Bottrill after a giant gun in WW1 developed by the British to rival the German gun, 'Big Bertha'.
- The 200 foot turning required 80 turns of the steering wheel.
- Big Lizzie carried 17 tons of crude oil fuel and drinking water for the journey.



# Big Lizzie

## What is here today!

Big Lizzie stands proudly in Barclay Square as a testimony to the foresight and initiative of the early pioneers. In 1971 as part of Red Cliffs Golden 50 year Jubilee ceremonies, Big Lizzie was returned to Red Cliffs, restored and is now a major icon for the area.

Big Lizzie was originally constructed to transport wool from the station properties adjoining Broken Hill. In October 1917, after nearly 2 years travelling, Big Lizzie arrived in Mildura. Due to flooding of the Murray River with no bridges or ferries suitable to carry her, Big Lizzie was unable to complete the journey and remained in Victoria.

With Frank Bottrill operating, Big Lizzie successfully proved her worth and was found to be ideal for pulling out and clearing mallee stumps. Her special "Dreadnaught Wheels" proving unstoppable no matter what the soil condition.

Big Lizzie weighs 45 tons, and was powered by a 60 horsepower Blackstone Crude Oil Engine. Originally with two trailers giving a total length of 30 m, Big Lizzie was able to haul 80 tonnes at a top speed of just 3 kilometers per hour.

Big Lizzie, the slow but steady "mechanical monster", whose efforts in clearing the land for Irrigation Settlement endeared herself to the community of Red Cliffs.


## THE CHAFFEY STORY

### THE VISION UNFOLDS

Today, Mildura is a living testimony to the foresight of the Canadian brothers George and WB Chaffey.

The Chaffey Trail is a heritage experience tracing the growth of the Chaffeyes' vision to make Mildura, Victoria, the site of Australia's first irrigation colony.


Visitors can gain a more comprehensive insight into the determination, vision and pioneering spirit of the people who helped to establish this region by visiting other Chaffey Trail sites.



### OTHER LINKS

- Visitor Information Centre
- 1 The Mildura Station Homestead
- 2 Mildura Homestead Cemetery
- 3 Rio Vista Historic House
- 4 Lock 11 & Mildura Weir
- 5 Mildura Wharf / Port of Mildura
- 6 Mildura Grand Hotel
- 7 Psyche Pumps / King's Billabong
- 8 Chateau Mildura
- 9 Merbein
- 10 Langtree Hall
- 11 Mildura Club
- 12 Big Lizzie

YOU ARE HERE



ENGINEERING HERITAGE  
THE INSTITUTION OF ENGINEERS AUSTRALIA  
MARKER  
Engineering Heritage Marker placed on 14 October 2017

## THE CHAFFEY TRAIL

Mildura ~ Australia's First Irrigation Colony

[www.thechaffeytrail.com.au](http://www.thechaffeytrail.com.au)

ENGINEERS AUSTRALIA  
Mildura Rural City Council



## APPENDIX A: REFERENCES

Maslin, Ron, 1982, *Big Lizzie – The Story of a Man and a Machine*, Sunnyland Press.

Liz Knott, Great, great grandniece of Frank and Madge Bottrill, January 2017.

Against the Odds – The Story of the Red cliffs Settlement by Mary Chandler Chapter 3  
Newspapers online on Trove -The Argus, Riverine Herald, Kerang Times, The Mildura  
Cultivator

Wikipedia

F. J. Kendall, 'Bottrill, Frank (1871–1953)', Australian Dictionary of Biography, National  
Centre of Biography, Aust. National University

A. H. McDonald & Co., Industrial Pioneers, 'Imperial Engine Works' - Melbourne, Australia  
1903 – 1969

Red Cliffs & District Historical Society and “Big Lizzie” Preservation Committee

Mildura Rural City Council – Archive Photos

## **APPENDIX B: OWNERS LETTER OF AGREEMENT**

Three emails of endorsement are:

- 1) Mildura Rural City Council as the custodians of the “Chaffey Trail” of which Big Lizzie is Site No. 12.
- 2) Red Cliffs Historical Society as representing the local Red Cliffs historical community.
- 3) Big Lizzie Association and Restoration Group as the custodians of Big Lizzie and its preservation.

**Scott Barnes**

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**From:** Julie Jewell <Julie.Jewell@mildura.vic.gov.au>  
**Sent:** Thursday, 22 June 2017 3:26 PM  
**To:** Scott Barnes  
**Subject:** Chaffey Trail Sign, Red Cliffs  
**Attachments:** CTrail Signs 2017 PROOF.pdf

Hello Scott,

I refer to our discussion last week regarding the Chaffey Trail signage program proposed that could blend in with your proposal for the Engineering Conference in October.

I took the concept of having the Chaffey Trail signage program developed 'together' and in principle, was appealing to our team.

At each of the Chaffey Trail sites (of which Big Lizzie has just been included) we have two signs. A sample of each is attached. This is a draft only and there are a couple of minor errors.

The common look and feel would need to remain.

Await your thoughts and perhaps a 'meeting'. October gives us time, however the process or actually having it erected to a 'deadline' means we may need to action immediately. Happy to discuss with your team.

Appreciate the update and sharing of the promotional opportunity.

Kind regards, cheers

Julie

**Julie Jewell** | Business Events & Special Projects

**Mildura Rural City Council**  
PO Box 105, Mildura Victoria 3502  
p: 03 5018 8311 | m: 0417 054 990  
e: [julie.jewell@mildura.vic.gov.au](mailto:julie.jewell@mildura.vic.gov.au)  
w: [www.mildura.vic.gov.au](http://www.mildura.vic.gov.au)

**Scott Barnes**

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**From:** Helen & Bob Walton <hpetsche@bigpond.net.au>  
**Sent:** Monday, 29 May 2017 9:21 AM  
**To:** Scott Barnes  
**Subject:** Re: Fwd: Engineers Australia - Big Lizzie Heritage Marker

Hi Scott,

Thanks for contacting us. We are most happy to be involved in any celebration for Big Lizzie. We organised a 100th birthday party with school children and locals a couple of years ago when we estimated she was completed. We also plan to have a celebration when it is 100 years from her arrival in Red Cliffs to begin the clearing contract.

There is a Big Lizzie Committee who are really the people who need to be involved. It is separate to the Historical Society. The chairman is Michael Terrill and I do not have an email address for him. I will get that ASAP and forward it back to you.

The Historical Society hosted a Centenary brainstorming meeting in February this year and from that meeting came some good ideas regarding Lizzie. One was the redoing of signage. We welcome the Engineers Conference involvement in a plaque etc but would like to have further discussions so that it is supportive to our planning.

Thanks for your interest in a local celebrity!

regards Helen Petschel  
 RedCliffs & District Historical Society  
 0427129584

**Scott Barnes**

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**From:** Michael Terrill <squidz62@gmail.com>  
**Sent:** Wednesday, 2 August 2017 7:35 PM  
**To:** Scott Barnes  
**Subject:** RE: EA Engineering Heritage - Big Lizzie

Hi Scott,

I will speak with our members regarding your ceremony, I cannot see any issues with somebody giving a short presentation on Frank Botrill. One of our members father worked with Frank on Big Lizzie in the district so I will approach him and see if he is interested. We also have a book published on Big Lizzie and would be happy to have some at hand for purchase by your members if required.

I will be in touch at a later date to confirm details but as we are a small voluntary group we don't have a lot of resources but will help where we can  
 Regards Michael

President Big Lizzie association and restoration group



